

SUBSTITUTE SPECIFICATION

AV Apparatus, Method for Using the Apparatus,
and AV SystemTechnical Field

5 The present invention relates to a technology regarding an audio and visual system (hereinafter AV system) consisting of at least two AV apparatuses, such as audio apparatuses and video apparatuses, connected by a bus to one another, and more particularly to a technique for the use of apparatuses in an AV system, where a plurality of AV apparatuses are to be operated in conjunction with one another, to
10 secure the availability of AV apparatus working in conjunction therewith.

Background Of The Invention

Nowadays, as communication systems consisting of sets of AV apparatus, such as video tape recorders (hereinafter VTRS) and television receivers (hereinafter TVs), and information processing apparatuses connected by a control bus which is
15 capable of carrying out communication of data and control signals in combination, and transmitting and receiving the data and the control signals among the apparatuses, communication systems using an IEEE 1394 serial bus or a USB (Universal Serial Bus), have been proposed.

20 An IEEE 1394 serial bus can accomplish both isochronous transfers, i.e. consecutive transfers of data such as digital AV signals at a constant transfer rate, and asynchronous transfers, i.e. transfers of control signals such as connection control commands as required.

A USB is capable of the aforementioned isochronous transfers, control

transfers used for transmission and reception of messages, and bulk transfers used for transfers of large quantities of data though the transfer rate is not guaranteed.

In a system using an IEEE 1394 serial bus or a USB, node IDs are automatically allocated according to the form of connection of each apparatus. If a new apparatus is added to or any apparatus is withdrawn from the system, bus resetting is effected, and node IDs are reallocated automatically to match the new forms of connection.

Furthermore, standardization is in progress for the AV/C Digital Interface Command Set of control signals for controlling various kinds of AV apparatuses from outside on an IEEE 1394 serial bus.

If, in such a situation, a system is built up in which various kinds of AV apparatuses are connected by an IEEE 1394 serial bus or a USB and data and control signals are communicated, any random AV apparatus may conceivably control another AV apparatus. One of the typical functions is conceivably one to secure the availability of an apparatus, e.g. a timed reservation function for video recording or playback.

However, the conventional timed reservation function allows the operator to make a timed reservation with each of the apparatuses involved, and each set V apparatus, in no way concerned with any other AV apparatus, merely executes an action such as outputting or starting to record AV data including video information and audio information irrespective of the state of use of the other AV apparatus. Therefore, when a timer reservation was to be set, the operator had to check for himself whether or not each apparatus would be available for operation when the reserved hours came.

Furthermore, where a chargeable program, such as a satellite broadcast program, was to be recorded by timed reservation and an unexpected extension occurred in the program duration, even if the satellite broadcast receiver itself could adjust itself to the contingency, the VTR to record that program would end the recording when the preset ending time arrived even though the unexpected extension of the duration occurred, and making it desirable to extend the recording hours.

An object of the present invention is to provide, in order to solve these problems, a technology for apparatus use in AV systems to enable a plurality of AV apparatuses in conjunction with one another to easily make timed reservations and accomplish reservation management.

Summary of the Invention

In order to solve the aforesaid problems, the methods described below are to be implemented, and AV apparatuses and AV systems to realize it are provided.

When information on apparatus use, such as a timed reservation, is indicated to a first AV apparatus and a second AV apparatus, the apparatus to operate in conjunction with the first AV apparatus when using a bus, is determined, and the second AV apparatus is accused via the bus connecting the two sets to determine the availability or unavailability of the second apparatus from a starting time until an ending time between which that second AV apparatus is to be used.

The second AV apparatus, in response to this inquiry, determines the availability or unavailability of the second AV apparatus by correlating it with apparatus use information on the second AV apparatus stored in an apparatus use information storage means, and sends a reply to the first AV apparatus.

If the second AV apparatus is available for the designated period of time, the first AV apparatus will store apparatus use information into the apparatus use information storage means of the first AV apparatus, and also store that apparatus use information into the apparatus use information storage means of the second AV apparatus. On the other hand, if it is unavailable, the first AV apparatus will either cancel that planned use or inquire of the second AV apparatus about the reason for the unavailability; and, if there is any conflicting request for the use of the apparatus, the first AV apparatus will perform processing, such as determining which request should be validated.

Execution of the use of any apparatus is communicated by the first AV apparatus and the second AV apparatus to each other at the time of, or a few minutes before, the execution of the use of the apparatus, to be followed by the execution of the use of the apparatus.

Further, when any detail of the use of the first AV apparatus is to be changed, the first AV apparatus is caused to read out the apparatus use information already stored in the apparatus use information storage means of the first AV apparatus and to display it on a display unit. Then, it notifies the second AV apparatus, to be affected by the change, of the change by altering the apparatus use information as desired. The second AV apparatus reads apparatus use information concerning the second AV apparatus out of its apparatus use information storage means and alters the apparatus use information accordingly.

Brief Description of The Drawings

FIG. 1 is a block diagram showing ~~timed~~ reservation in an AV system, which

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represents one mode of carrying out the present invention.

FIG. 2 is a diagram of reservation data to be managed in the AV apparatus serving as an input apparatus.

FIG. 3 is a diagram of reservation data to be managed in the AV apparatus serving as a related apparatus.

FIG. 4 is a block diagram showing reservation data to be managed in the input apparatus or the related apparatus in the AV system of the present invention.

FIG. 5 is a flowchart of timed reservation processing.

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FIG. 6 is a diagram of screen information on the input apparatus in timed reservation processing.

FIG. 7 is a diagram of screen information on the input apparatus when a notice is given that timed reservation processing cannot be executed.

FIG. 8 is a diagram of screen information on the input apparatus displaying the situation of reservations in the related apparatus in timed reservation processing.

FIG. 9 is a diagram of screen information on the input apparatus when a notice is given that there is a conflicting reservation in the designated period of time in timed reservation processing.

FIG. 10 is a diagram of screen information on the input apparatus when the list of timed program reservations is displayed.

FIG. 11 is a diagram of screen information on the related apparatus when the list of timed program reservations is displayed.

FIG. 12 is a flowchart of the process of checking reservation particulars by each AV apparatus when the AV apparatus system is altered in configuration.

FIG. 13 is a diagram of screen information when a notice is given of the

unavailability of either the input apparatus or the related apparatus.

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FIG. 14 is a diagram of a command packet and response packet for communication between AV apparatuses connected by a control bus.

FIG. 15 is a diagram of timed reservations where a chargeable program is to be recorded by timed reservation.

FIG. 16 is a diagram of screen information when a notice is given of conflict between the next reserved programs in connection with a rescheduling of broadcast programs.

FIG. 17 is a block diagram of an AV system, which represents another mode of carrying out the present invention.

FIG. 18 is a diagram of screen information on the input apparatus when the list of timed program reservations is displayed.

FIG. 19 is a diagram of screen information on the related apparatus when the list of timed program reservations is displayed.

FIG. 20 is a block diagram of an AV system, which represents another mode of carrying out the present invention.

FIG. 21 is a diagram showing actual examples of reservation data to be managed in AV apparatuses in the AV system of the present information.

Best Modes for Carrying Out the Invention

The present invention will be explained in greater detail, with reference to the accompanying drawings. Incidentally, although the modes of implementation described below concern cases of securing the availability of an apparatus in connection with a timed reservation out of various techniques for securing the

availability of the bus, there is no restriction to timed reservations, but any case can be covered as long as the availability of an apparatus can be secured and a conflict between requests for the use of the same apparatus can be avoided.

FIG. 1(a) shows an example of an AV system, which is presented here to illustrate the present invention.

In this example, there is an AV system comprising satellite Broadcast receivers 100a and 100b for receiving broadcast programs utilizing communication satellites; a recording apparatus 110, which may be a video tape recorder, for recording AV data, including both video and audio data, on a magnetic tape, or a DVD, HD or MO, or the like, for recording AV data on a magnetic disk or an optical disk; and a monitor 120, which may be a TV receiver or a personal computer display unit, connected by a bus 10, which may be an IEEE 1394 serial bus or a USB.

The following description is directed to a method of making a timed reservation, when an operator instructs the satellite broadcast receiver 100a to make a reservation of "timed recording of a satellite broadcast program by the recording apparatus 110," as well as to the reservation executed by the satellite broadcast receiver 100a and the recording apparatus 110.

At first, a description will be presented concerning the configurations of the satellite broadcast receiver 100a and the recording apparatus 110. Incidentally, the satellite broadcast receiver 100b has the same configuration as the satellite broadcast receiver 100a.

As seen in FIG. 1(b), the satellite broadcast receiver 100a consists of a user interface section 101 using an input instruction device, such as a remote control unit or a tablet, for interfacing with the operator, such as for receiving timed reservation

setting and display instructions; a communication interface section 102 for communicating AV data and control signals with other apparatuses (the satellite broadcast receiver 100b, the recording apparatus 110 and the monitor 120 in this case) via the bus 10; a satellite broadcast tuner section 103 for receiving satellite broadcast programs; a timed reservation section 104 for processing timed reservations; a playback section 107 for playing back received broadcast programs on the monitor 120; and a control section 108 for controlling the operations of various sections in the satellite broadcast receiver 100a.

The timed reservation section 104 consists of a reservation data management section 105 for managing data regarding timed reservations and a time management section 106 for giving a notice by issuing an alarm or otherwise when the time of a reserved operation arrives.

The recording apparatus 110 consists of a user interface section 111 using an input instruction device, such as a remote control unit or a tablet, for interfacing with the operator, such as for receiving recording or playback, timed reservation setting and display instructions; a communication interface section 112 for communicating AV data and control signals with other apparatuses (the satellite broadcast receivers 100a and 100b, and the monitor 120 in this case) via the bus 10; a VHF/UHF broadcast tuner section 113 for receiving VHF/UHF broadcast programs; a timed reservation section 114 for processing timed reservations of VHF/UHF broadcast programs; a recording section 117 for recording AV data, such as broadcast programs on a recording medium, such as a magnetic tape or an optical disk; a playback section 118 for playing back AV data recorded on a recording medium; and a recording apparatus control section 119 for controlling the operations of the recording apparatus 110.

The timed reservation section 114 consists of a reservation data management section 115 for managing data regarding timed reservations and a time management section 116 for giving a notice by issuing an alarm or otherwise when the time of a reserved operation arrives.

5 Next, with reference to FIGS. 2 and 3, one configuration of the reservation data to be managed by the time management section 105 of the above-mentioned satellite broadcast receiver 100a and the reservation data management section 115 of the recording apparatus 110 will be described.

10 First, in the satellite broadcast receiver 100a (input apparatus), which is instructed by the operator to make a timed reservation, apparatus use information has a data configuration consisting of a reservation ID 201, reservation hours (starting/ending times) 202, a related apparatus ID 203, and various setting information 204, which constitute a set of reservation data for managing one reservation.

15 The reservation ID 201, which is an identifier for identifying reservation data to be managed in the input apparatus 100a, allocates a unique number according to the sequence of setting or time sequence. The reservation hours 202 are the requested reservation hours (starting/ending times). The related apparatus ID 203 is the inherent identifier of an apparatus operating in conjunction during the execution of the reservation (related apparatus). In this example, it is the inherent identifier of the recording apparatus 110. If no apparatus is required to operate in conjunction
20 therewith, the ID of the satellite broadcast receiver 100a or a value that is not used as an ID is set. Where there are a plurality of related apparatuses, IDs for all those apparatuses are set. The various setting information 204 comprises items of

information required for the setting and execution of a timed reservation by the input apparatus and the related apparatus in conjunction therewith, including for instance the type of the function to be executed, such as playback or recording, channel number, recording speed, such as SP, LP or EP, and the recording mode, such as analog or digital.

Next, in the recording apparatus 110 (related apparatus) operating in conjunction with the satellite broadcast receiver 100a at the time of executing a reservation, one reservation is managed in a data configuration consisting of a reservation ID 301, reservation hours (starting/ending times) 302, an input apparatus ID 303, and various setting information 304 for the related apparatus.

The reservation ID 301, which is an identifier for identifying reservation data to be managed in the related apparatus 110, allocates a unique number according to the sequence of setting or time sequence. The reservation hours 302 are the requested reservation hours (starting/ending times). The input apparatus ID 303 is the inherent identifier of the apparatus accepting a reservation and operating in conjunction during the execution of the reservation (input apparatus). In this example, it is the inherent identifier of the satellite broadcast receiver 100a. If no apparatus is required to accept a reservation and operate in conjunction therewith, the ID of the recording apparatus 110 or a value that is not used as an ID is set. The various setting information 304 comprises items of information required for the setting and execution of a timed reservation by the recording apparatus 110, such as playback or recording, channel number, recording speed, such as SP, LP or EP, and the recording mode, such as analog or digital.

Next, with reference to FIG. 4 and FIG. 5, the procedure for processing a

timed reservation with the above-described AV system will be described.

First, the operator inputs an instruction for a timed reservation and reservation contents 400 (step 501) to the satellite broadcast receiver 100a via an input instructing device, such as a remote control unit or an input tablet, and, if the execution of that reservation is to be accomplished in conjunction with any other apparatus than the satellite broadcast receiver 100a (the recording apparatus 110 in this example), determines the related apparatus to be controlled by it (step 502).

FIG. 6(a) shows an example of a frame displayed on the monitor 120 or the liquid crystal screen of a remote control unit at step 501 and step 502. First, when the operator designates a program guide indicator on the remote control unit 600 (FIG. 6(b)), a frame 610 showing a program guide is displayed. When the program to be reserved is selected on the frame 610 using a direction indicator 602 and registration is instructed with a registration indicator 606 on the remote control 600, a frame 620 for the selection of the function to be executed is displayed. On the frame 620, the function to be executed (playback or recording) as reserved is selected using the direction indicator 602, and the decision is instructed with a decision indicator 604. If recording is selected here, a frame 630 for selection of the recording apparatus, i. e. the related apparatus, is displayed. On the frame 630 is displayed information on apparatuses having a video recording function out of the apparatuses connected to the bus 10 (the type, such as VTR or DVD, the manufacturer's name and so forth).

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~~Since there is only one recording apparatus on the bus in the case of the system in this example (FIG. 1), information on the recording apparatus 110 alone is displayed.~~

If a decision is instructed here with the decision indicator 604, a frame 640 for

the selection of the tape speed and the recording mode is displayed. As the tape speed and the recording mode are selected on the frame 640 and a decision is instructed with the decision indicator 604, information setting concerning the recording reservation is completed.

5 Next, the timed reservation section 104 in the satellite broadcast receiver 100a inquires of the timed reservation section 114 of the related apparatus (recording apparatus 110) via the control section 108, the communication interface section and the bus as to whether or not any use is scheduled for the designated reservation hours, i.e. whether or not reservation data can be stored into the reservation data management
10 section 115 (step 503). Whereas this inquiry here is made by transmitting information on at least the starting time and the ending time of the intended use of the related apparatus, the contents of the reservation data themselves may as well be transmitted simultaneously with the inquiry about the schedule of use.

15 If, as a result, a notice of the absence of any scheduled use in the designated hours is received from the recording apparatus 110, the reservation data management section 105 prepares and manages reservation data 410 on the basis of the inputted reservation contents 400 (step 504). The reservation data 410 here consists of reservation data ID 411 in the input apparatus 100a, reserved hours 412 in reservation contents 400, the inherent ID 413 of the related apparatus 110 on the bus, and various
20 information 414 including the function to be executed, channel number, program title, recording speed, and the recording mode.

At the same time, the input apparatus 100a transmits necessary information for the preparation of reservation data 420 to the timed reservation section 114 of the related apparatus 110, and issues a request for setting of this reservation data (Step

505). In response to this, the timed reservation section 114 of the related apparatus 110, having received the setting request, prepares the reservation data 420, and manages it in the reservation data management section 115.

5 The reservation data 420 here consists of reservation data ID 421 in the related apparatus 110, reserved hours 422 in reservation contents 400, the inherent ID 423 of the input apparatus 100a on the bus, and various setting information 424 including the function to be executed, channel number, program title, recording speed, and the recording mode.

10 If, at step 503, a notice of the presence of any scheduled use in the designated hours is received from the related apparatus 110, the operator is asked if the timed reservation is to be revised (step 506) and, if it is to be revised, the processing will return to step 501 or, if it is not to be revised, the processing will be terminated. FIG. 7 shows an example of a screen which is provided when an inquiry is made with the operator. If an option 701 is indicated on this frame 700, the processing will return to
15 step 501 or, if an option 702 is indicated, the processing will be terminated.

20 As regards information concerning the related apparatus 110 here at step 502, the control section 108 of the input apparatus 100a acquires and manages an apparatus which is present on the bus at the time of bus resetting or regularly and is to become the related apparatus. If there is only one related apparatus on the bus 10, that apparatus can be automatically determined to be the related apparatus 110. It is also possible, if there are two or more on the bus 10, to indicate those apparatuses on the monitor 120 or the liquid crystal frame of a remote control unit, and let the operator determine one every time a reservation is made. Alternatively, it is also possible to predetermine an order of precedence for related apparatuses managed by the control

section 108, have them memorized by the control section 108, and determine the apparatus automatically by referring to that memory. Or, it is also possible to determine automatically an appropriate apparatus out of related apparatus information managed by the control section 108 according to the recording medium (VHS tape, SVHS tape, photomagnetic disk or the like) and the recording mode (analog, digital or the like) designated by the operator. For instance, if the operator designates digital recording, the control section 108 will select out of related apparatus information what apparatus permits digital recording and is mounted with an SVHS tape, and use it as the related apparatus.

It is also possible at step 503 for the satellite broadcast receiver 100a to read out reservation data 300 managed by the timed reservation section 114 of the related apparatus 110, and check to see if there is any use scheduled for the designated reservation hours.

FIG. 8 shows a frame 800, which is an example of a display by the input apparatus 100a as to the situation of reservations in the related apparatus 110.

Or, at step 505, it is also possible for the reservation data management section 105 of the satellite broadcast receiver 100a to prepare reservation data 420, transmit this data to the timed reservation section 114 of the recording apparatus 110, and to have the reservation data 420 set in the reservation data management section 115 in the timed reservation section 114 of the related apparatus 110. Further, it is also possible for the control section 108 in the satellite broadcast receiver 100a to directly set the reservation data 420 in the reservation data management section 115 of the related apparatus 110.

Or, at step 506, if there already is a scheduled use on the part of the recording

apparatus 110, it is also possible to notify the operator of that schedule to let him decide which reservation is to be given priority. In this case, regarding a canceled reservation, it is also possible that the apparatus whose reservation is canceled may delete all the reservation data in the apparatuses having reservation data concerning the reservation. FIG. 9 shows a frame 900 as an example of a case in which the operator is notified of a conflict between reservations and is asked which should be given priority. If an option 901 is indicated on the frame 900, the timed reservation section 104 of the satellite broadcast receiver 100a transmits a command to the timed reservation section 114 of the recording apparatus 110 to delete the reservation which is already set. In response, the timed reservation section 114 of the recording apparatus 110 acquires the reservation data concerning the reservation from the reservation data management section 115, deletes the reservation data, and at the same time deletes all the reservation data in the apparatuses having reservation data concerning the reservation.

If an option 902 is indicated, the timed reservation instructed on the frames 610 to 640 is canceled. Obviously, various mediatory manners of processing for conflicting reservations are also possible, such as storing in advance an order of precedence in the control section 108 of the input apparatus 100a according to which the reservation of a chargeable program, such as a satellite broadcast program, is automatically given priority, and the contents of the stored information are referenced at the time of making a timed reservation.

FIG. 10 shows an example of screen on the input apparatus, i.e. the satellite broadcast receiver 100a, where a list of the reservation contents for which timed reservations are already set is displayed.

First, when the operator designates a confirmation indicator 605 on the remote control unit 600, the timed reservation section 104 reads reservation data 200 stored in the reservation data management section 105 of the satellite broadcast receiver 100a, and displays a frame 1000 on the monitor 120 via the user interface section 101. On the frame 1000, such items as the reservation number, date, reservation hours, channel number, program title, and the function to be executed are displayed for each reservation. When a detail indicator 603 is designated to see more details, a frame 1020 is displayed. On the frame 1020 are displayed contents including items which could not be displayed on the frame 1000.

Next, the processing for effecting a change in the contents of an already set timed reservation will be described. When any reservation is selected from the contents displayed on the frame 1000, and a change is instructed with a change indicator 606, and a reservation change frame 1010 appears. For the deletion of a reservation or a change in hours, the function to be executed or the like is instructed on the frame 1010, and the timed reservation section 104 in the satellite broadcast receiver 100a deletes or alters pertinent contents concerning the reservation stored in the reservation data management section 105. And, the timed reservation section 114 of another apparatus operating in conjunction therewith at the time of executing a reservation (the recording apparatus 110 in this case) is requested to delete or alter pertinent contents of reservation data concerning the reservation.

In response, the timed reservation section 114 of the recording apparatus 110 retrieves reservation data regarding the reservation stored in the reservation data management section 115, and deletes or alters pertinent contents thereof. It is also possible here for the timed reservation section 104 of the satellite broadcast receiver

100a to acquire reservation data stored in the reservation data management section 116 within the recording apparatus 110, to retrieve reservation data concerning the reservation and, after deleting or altering pertinent contents thereof, to rewrite them into the reservation data management section 115.

5 Further, FIG. 11 shows an example of a screen on the related apparatus, i.e. the recording apparatus 110, where a list of the reservation contents for which timed reservations are already set is displayed.

10 When the operator requests a confirmation of alteration of reservation contents, the timed reservation section 114 in the recording apparatus 110 reads reservation information stored in the reservation data management section 115, and displays a frame 1100 on the monitor 120 via the user interface section 111. On the frame 1100 timed recording reservations of broadcast programs received from the VHF/UHF tuner section 113 built into the recording apparatus 110 and timed recording reservations of broadcast programs received by the satellite broadcast
15 receivers 100a and 100b are simultaneously displayed. The two are distinguished from each other by a ★ as indicated by 1110 in FIG. 11 or by stating the name of the receiver.

20 Next, with reference to FIG. 12, the processing that is effected when the bus is reset or the configuration of the AV system is altered by, for instance, the withdrawal of any connected apparatus will be described.

 First, the timed reservation sections 104 and 114 of the apparatuses, which have recognized the change in the configuration of the AV system, read in reservation data 200 or 300 managed by the reservation data management sections 105 and 115 (step 1201), and check the contents of each. And, referring to the input apparatus ID

303 or the related apparatus ID 203 in the reservation data, if the values are other than those of their respective apparatus IDs, they inquire of the apparatus indicated by the input apparatus ID 303 or the related apparatus ID 203 about the state of the apparatus (presence, availability or the like) (step 1202). And, if the result indicates that the apparatus inquired of is unavailable, the operator is notified of an impossibility to execute the reservation data, and cancels the reservation or automatically deletes the reservation data (step 1203). This makes possible successful management of the reservation data even if the system configuration changes. FIG. 13 shows an example of a frame 1300 in which a notice is given to the operator of the unavailability of the apparatus inquired about. If an option 1301 is designated on the frame 1300, the timed reservation sections 104 and 114 delete the reserved data. If an option 1302 is designated, the frame 1300 will remain displayed until the apparatus inquired about becomes available.

Next, regarding the packet structure of control signals for transferring inquiries from the satellite broadcast receiver 100a to the recording apparatus 110 and the response from the recording apparatus 110 to the satellite broadcast receiver 100a on the bus 10 at step 503, step 505 and step 1202, one example of the configuration of each packet is shown in FIG. 14(a) and FIG. 14(b).

When setting or acquisition of reservation data is requested from the satellite broadcast receiver 100a to the recording apparatus 110, a command packet 1400 of FIG. 14(a) is used.

The command packet 1400 consists of a command sender address 1401, a command sender's subunit address 1402, a command recipient address 1403, a command recipient's subunit address 1404, and a command content 1405.

The command sender address 1401 represents the only address of the apparatus issuing the transmission command on the bus 10, and in the case of this example, it is the address of the satellite broadcast receiver 100a on the bus 10.

5 The command sender's subunit address 1402 is the address of an individual function (the tuner section, timed reservation section or the like) in the apparatus issuing commands. In the case of this example, it is the address of the tuner section 104 in the satellite broadcast receiver 100a.

10 The command recipient address 1403 represents the only address of the apparatus receiving the command on the bus 10, and in the case of this example, it is the address of the recording apparatus 110 on the bus 10.

The command recipient's subunit address 1404 is the address of an individual function (the tuner section, timed reservation section or the like) in the apparatus receiving commands. In the case of this example, it is the address of the tuner section 114 in the recording apparatus 110.

15 The command content 1405 represents a request to the timed reservation section of the command recipient (in this case the timed reservation section 114 within the recording apparatus 110) for writing in, reading out or changing reservation data and its content.

20 On the other hand, responses from the recording apparatus 110 to the satellite broadcast receiver 100a uses a response packet 1410, as shown in FIG. 14(b).

The response packet 1410 consists of a response sender address 1411, a response sender's subunit address 1412, a response recipient address 1413, a response recipient's subunit address 1414, and a response content 1415.

The response sender address 1411 represents the only address of the apparatus

issuing the response on the bus 10, and in the case of this example, it is the address of the recording apparatus 110 on the bus 10.

The response sender's subunit address 1412 is the address of an individual function (the tuner section, timed reservation section or the like) in the apparatus
5 issuing responses. In the case of this example, it is the address of the tuner section 114 in the recording apparatus 110.

The response recipient address 1413 represents the only address of the apparatus receiving the response on the bus 10, and in the case of this example, it is the address of the satellite broadcast receiver 100a on the bus 10.

10 The response recipient's subunit address 1414 is the address of an individual function (the tuner section, timed reservation section or the like) in the apparatus receiving responses. In the case of this example, it is the address of the tuner section 104 in the satellite broadcast receiver 100a.

The response content 1415 represents a response to the timed reservation
15 section of the response recipient (in this case the timed reservation section 114 within the recording apparatus 110) to a request for writing in, reading out or altering reservation data, such as the contents or the result of alteration of the reservation data.

As described so far, according to this example, in a system consisting of the satellite broadcast receivers 100a and 100b and the recording apparatus 110 connected
20 to each other by the control bus 10, the timed reservation sections 104 and 114, including the reservation data management sections 105 and 115, are provided in the satellite broadcast receivers 100a and 100b and the recording apparatus 110, and each of the executing apparatuses manages the reservations pertaining thereto out of all the timed reservations present on the bus 10.

For instance, if the satellite broadcast receiver 100a is instructed to make a timed reservation as referred to above, the timed reservation section 104 stores the contents of reservation data into the reservation data management section 105 and, at the same time, also processes their storage into the reservation data management section 115 of the recording apparatus 110 operating in conjunction therewith.

This enables any other apparatus than the satellite broadcast receiver 100a and the recording apparatus 110, e.g. the satellite broadcast receiver 100b, if it is instructed to make a timed reservation in conjunction with the recording apparatus 110, to grasp all the reservations using the recording apparatus 110 existing on the bus 10 by only accessing the reservation data management section 115 of the recording apparatus 110.

Furthermore, as will be described later in greater detail, if an instruction to make a timed reservation in conjunction with the satellite broadcast receiver 100a is received from another apparatus, it is possible to grasp all the reservations using the satellite broadcast receiver 100a existing on the bus 10 by only accessing the reservation data management section 105 of the satellite broadcast receiver 100a.

Further, the reservation data to be stored in the reservation data management sections 105 and 115 are supposed to have a configuration including an input apparatus ID 303 or a related apparatus ID 203.

As this enables apparatuses having processed reservation data and apparatuses operating in conjunction therewith to execute reservations to be identified, any reconfiguration of the system or processing to cancel a reservation in the event of conflict or alteration can be addressed more easily.

With regard to the mode of implementing a reservation, it is possible to adopt

a configuration in which, when the time to execute a reservation comes, the satellite broadcast receiver 100a and the recording apparatus 110 can individually execute a reservation on the basis of the reservation data stored therein. It is further possible to equip the satellite broadcast receiver 100a with a function to remotely control the recording apparatus 110 so that, when the time to execute a reservation comes, the satellite broadcast receiver 100a can remotely control the recording apparatus 110 to execute the reservation. In this case, the reservation data 200 managed by the reservation data management section 105 in the satellite broadcast receiver 100a may include, in addition to the related apparatus ID 203, data indicating whether or not to remotely control another apparatus.

Further the reservation data 300 managed by the reservation data management section 115 in the recording apparatus 110 may include, in addition to the input apparatus ID 303, data indicating whether or not it may to be remotely controlled by another apparatus.

Next, with reference to FIG. 15, how a chargeable program, such as a satellite broadcast program, is to be recorded by a timed reservation will be explained.

Following the above described procedure for a timed reservation, the reservation data management section 105 in the satellite broadcast receiver 100a is supposed to store reservation data for a pay TV program 1510, such as a sportscast, from a scheduled starting time 1501 until a scheduled ending time 1502 and for another program 1520 from a scheduled starting time 1504 later than that.

A few minutes before the scheduled starting time 1501 of the reserved pay TV program 1510, the timed reservation section 104 acquires the latest program guide and the like, and checks to see if the program 1510 will start at its scheduled time.

There also is an alternative method by which the timed reservation section 104 can acquire a new program guide at fixed intervals of time.

If the program 1510 starts as scheduled, it will start recording the program in conjunction with the recording apparatus 110 when the scheduled starting time 1501 comes.

On the other hand, if the program 1510 starts behind schedule, it will acquire the ending time of the program, and check whether or not the ending time will conflict with the scheduled starting time 1504 of the later reserved program 1520. And, if it will, the operator will be notified to that effect.

FIG. 16 shows an example of a frame 1600 displayed on the monitor 120. If an option 1601 is indicated on the frame 1600, the timed reservation section 104 in the satellite broadcast receiver 100a will change the reservation hours 202 in the reservation data 200 concerning the reserved program 1510, and delete the reservation data 200 concerning the reserved program 1520. At the same time, it will transmit to the timed reservation section 114 in the recording apparatus 110 a request for a change in the reservation hours 302 in the reservation data 300 concerning the reserved program 1510 and a request for deletion of the reservation data 200 concerning the reserved program 1520.

In response, the timed reservation section 114 in the recording apparatus 110 will change the reservation hours 302 in the reservation data 300 concerning the reserved program 1510 stored in the reservation data management section 115, and delete the reservation data 300 concerning the reserved program 1520. If an option 1602 is indicated, the reserved program 1520 will be recorded during the progress thereof, but it is also possible for the operator to choose the program to be

given priority.

Next, after the recording of the reserved program starts from its scheduled starting time 1501, a few minutes before its scheduled ending time 1502, the timed reservation section 104 of the satellite broadcast receiver 100a acquires the latest program guide and the like, and checks to see if the program 1510 will end at its scheduled time. There also is an alternative method here by which the timed reservation section 104 can acquire a new program guide at fixed intervals of time.

If the program 1510 ends as scheduled, it will complete recording the program in conjunction with the recording apparatus 110 when the scheduled ending time 1502 comes.

On the other hand, if the program 1510, as is usual with a sportscast, for instance, is extended beyond the scheduled ending time, the timed reservation section 104 of the satellite broadcast receiver 100a will notify the operator to that effect by, for example, displaying the frame 1600 on the monitor 120. And, if the option 1601 is indicated on the frame 1600, the timed reservation section 114 in the recording apparatus 110a will delete the reservation data 200 concerning the reserved program 1520, and transmit to the timed reservation section 114 in the recording apparatus 110 a request for a deletion of the reservation data 200 concerning the reserved program 1520.

Monitoring is continued until the end of the reserved program 1510, and upon completion of the program 1510, the fact that program 1510 has ended is transmitted to the timed reservation section 114 in the recording apparatus 110. In response, the timed reservation section 114 in the recording apparatus 110 deletes the reservation data 300 concerning the reserved program 1520 stored in the reservation data

management section 115. And, recording is continued until a notice of the end of the program comes from the satellite broadcast receiver 100a. If the option 1602 is indicated, either the reserved program 1520 will begin to be recorded during the progress thereof, or the operator is allowed choose the program that is to be given priority.

This arrangement makes it possible to flexibly adapt to an unexpected extension of a reserved program. Although the operator is notified to have the reservation data 200 deleted in the example described above, it is also possible to predetermine the order of precedence when the reservation data 1510 is set and to have the timed reservation section automatically delete the reservation data 200 in the event of any unexpected change in the reservation data, such as an extension of the current program.

Hereupon, although the satellite broadcast receiver 100a operated the input apparatus and the recording apparatus 110 operated as the related apparatus in the above-described system, a configuration in which the recording apparatus 110 serves as the input apparatus and the satellite broadcast receiver 100a is the related apparatus is also conceivable. In this case, the recording apparatus 110 requests a timed reservation, and the reservation data is stored in the reservation data management section 115 within the recording apparatus 110 and the reservation data management section 105 within the satellite broadcast receiver 100a. The only difference is that the reservation data management section 115 within the recording apparatus 110 manages the reservation data 200, and the reservation data management section 105 within the satellite broadcast receiver 100a manages the reservation data 300, but the overall operation is similar to what was described with respect to the foregoing

example.

Next, the case of a system in which, as illustrated in FIG. 17, various apparatuses are connected to the bus will be described.

The system consists of a personal computer (hereinafter PC) 1701, a DVD recording/playback apparatus 1702 for playing back or recording on DVDS, an MD recording/playback apparatus 1703 for playing back or recording on MDs, a satellite broadcast receiver 1704 for receiving satellite broadcasts, a VTR 1705 for playing back or recording on a magnetic tape, a cable broadcast receiver 1706 for receiving cable broadcasts, and a monitor 1707 for displaying AV data, such as a TV.

Each of the apparatuses 1701 to 1704 is provided with a timer reservation section of the above-described kind. The apparatus serving as the input apparatus, when receiving a timed reservation requested by the operator, generates reservation data 200 and stores this data into the timed reservation section within the apparatus; and, at the same time, requests a related apparatus operating in conjunction therewith to generate reservation data 300 and store that data into the timed reservation section within the apparatus. In this manner, the apparatus serving as the input apparatus, when trying to make a timed reservation with the targeted related apparatus, has to access only the timed reservation section of the related apparatus to determine if it is available or not.

FIG. 18 shows a program reservation list frame 1800 displayed to confirm the state of timed reservations for the satellite broadcast receiver 1704. For the frame 1800, the reservation data 200 managed by the timed reservation section is read out, and information provided by the reservation data 200 (date, reservation hours, channel, program title, and the function to be executed) is displayed. Hereupon, this

system has, as apparatuses for video recording, the DVD 1702, the MD 1703 and the VTR 1705. On the frame 1800 there is displayed, when the function to be executed is recording, as indicated by item 1801, an indicator as to which apparatus should perform recording with reference to the related apparatus ID 203 within the reservation data 200.

Similarly, the DVD 1702 has, as apparatuses for supplying information, the PC 1701, the satellite broadcast receiver 1704 and a cable broadcast receiver 1706. Therefore, as shown in FIG. 19, in a frame 1900, which is displayed when the state of timed reservations is to be confirmed with the DVD 1702, it is also possible to display, with reference to the input apparatus ID 303 within the reservation data 300, information 1901 concerning apparatuses to supply reservation contents.

Further, a case will be described in which, as illustrated in FIG. 20, a satellite broadcast receiver and a VTR are integrated to have the functions of input and related apparatuses. This system consists of an integrated satellite broadcast receiver-VTR apparatus 2000, a DVD 2020, a monitor 2030 and a cable broadcast receiver 2040.

First, the configuration of the integrated satellite broadcast receiver-VTR apparatus 2000 will be described. The integrated apparatus 2000 consists of a user interface section 2001 for communicating recording or playback timed reservation or display information with the operator using an input instructing device, such as a remote control unit or a tablet, a communication interface section 2002 for communicating data and control signals with other apparatuses (a DVD 2020, a monitor 2030 and a cable broadcast receiver 2040 in this case) via the bus 10, a satellite broadcast tuner section 2003 for receiving satellite broadcasts, a VHF/UHF tuner section 2004 for receiving VHF/UHF broadcasts, a recording section 2005 for

recording broadcast programs and the like on a magnetic tape, a playback section
2006 for playing back AV data on a magnetic tape or actually reproducing broadcast
programs on the monitor 2030, a control section 2007 for controlling the actions of
various constituent sections, and a timed reservation section 2010 for processing the
5 timed reservation of satellite broadcast programs or VHF/UHF broadcast programs.
Here the control section 2007 further consists of a tuner control section 2008 for
effecting the control required to view satellite broadcasts and VHF/UHF broadcasts,
and a VTR control section 2009 for effecting the control necessary to record or play
back broadcast programs. Further, the timed reservation section 2010, as described
10 above, consists of a reservation data management section 2011 and a time
management section 2012.

The integrated apparatus 2000, when a broadcast program is to undergo timed
recording on the DVD 2020, can operate as an input apparatus, or when a program
received by the cable broadcast receiver 2040 is to undergo timed recording by the
15 integrated apparatus 2000, it can operate as a related apparatus. An example of the
configuration of the reservation data to be managed by the reservation data
management section 2011 in this case is shown in FIG. 21.

The reservation data 2100 consists of a reservation ID 2101, reservation hours
(starting/ending times) 2102, an input apparatus ID 2103, a related apparatus ID 2104,
20 and various setting information 2105.

The reservation ID 2101 is the only identifier for identifying reservation data
managed by the reservation data management section 2011. The reservation hours
2102 are the requested reservation input reservation hours (starting/ending times).

The input apparatus ID 2103 is the only identifier of the apparatus which

operates to accept and execute reservations on the bus 10. When a broadcast program is to undergo timed recording on the DVD 2020, since the input apparatus is the integrated apparatus 2000, the ID of the integrated type is set. When a program received by the cable broadcast receiver 2040 is to undergo timed recording by the integrated apparatus 2000, since the input apparatus is the cable broadcast receiver 2040, the ID of the cable broadcast receiver 2040 is set.

The related apparatus ID 2104 is the only identifier of the apparatus operating in conjunction on a reservation on the bus 10. When a broadcast program is to undergo timed recording on the DVD 2020, since the input apparatus is the DVD 2020, the ID of the DVD is set. When a program received by the cable broadcast receiver 2040 is to undergo timed recording by the integrated apparatus 2000, since the input apparatus is the integrated apparatus 2000, the ID of the integrated apparatus 2000 is set.

The various items of setting information 2105 includes various items of information needed for setting and executing a timed reservation, such as the function to be executed, i.e. playback or recording, channel number, recording speed, i.e. SP, LP or EP, and the recording mode, i.e. analog or digital.

The foregoing arrangement makes it possible, by having the reservation data management section 2011 manage the reservation data 2100, including the ID 2103 of the input apparatus to accept and execute reservations and the ID 2104 of the related apparatus operating in conjunction therewith, to grasp where a reservation is executed and with which apparatus the operation takes place, and thereby facilitates the management of timed reservations between apparatuses.

Further, when a timed reservation is to be made, time adjustment among

apparatuses is required. Therefore, a conceivable method is to use, in the above-described timed reservation system, an apparatus, which is responsible for the control of the bandwidth and channel of synchronous transfers on the bus and power management (e.g. an apparatus equipped with a bus manager or an isochronous resource manager in a system using IEEE 1394 and serving as the route), or an apparatus, such as a tuner, capable of acquiring time information from an outside broadcasting station or the like and of making a time adjustment on that basis, is used as the input apparatus for the time management section 106 or 116, and operates to periodically accomplish time adjustment among the apparatuses connected on the bus.

Another conceivable method is to let any apparatus operating in conjunction with the apparatus executing a timed reservation request, when a timed reservation is requested, the timer inputting apparatus, to carry out time adjustment or acquire time and accomplish adjustment for itself.

As hitherto described, a feature of the present invention consists in that, when a requests for a timed reservation is inputted to an AV apparatus to serve as the input apparatus, it sets in its own timed reservation section the necessary reservation data, and at the same time sets the necessary reservation data in the related apparatus as well. This arrangement enables each apparatus to flexibly respond to the setting of a timed reservation in any other apparatus.

The technique for apparatus use pertaining to the present invention is suitable for avoiding conflicts in the use of apparatuses and for harmonizing the use of apparatuses on a bus, because each AV apparatus is enabled to grasp all information relevant to itself, out of the information on the use of all the apparatuses present on the bus, set in other AV apparatuses than itself, making it possible to acquire all

information on the use of apparatuses present on the bus and concerning related apparatuses by inquiring only of the related apparatus it controls about the particulars of its bus use.